

AIR-INLET ASSEMBLY FOR A GAS COOKING APPLIANCE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. App. Ser. No. 10/248,973, filed March 6, 2003, and entitled "Air Inlet Assembly for a Gas Cooking Appliance," which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] This invention relates generally to gas cooking appliances, and, more particularly, to an air-inlet assembly for a cooking appliance and cooking appliances incorporating such air inlet assemblies.

[0003] Gas fired stoves, ovens, and ranges typically include one or more gas heating units coupled to a main gas line to the appliance and providing fuel to the heating units, sometimes referred to as burners. In a domestic range, a gas line is connected to a distribution manifold within the appliance to direct gas to a plurality of surface burners on a cooktop or to baking elements within an oven cavity. Operation of the surface burners is usually accomplished with burner control knobs located on the front wall of the appliance in front of the cooktop or on the cooktop surface. Below each knob is a circular orifice, which allows air to pass down into the burner box of the cooktop. When a control knob is actuated, fuel is supplied to associated burners and an ignition module creates a spark to ignite the gas and produce a flame.

[0004] Electronic, touch-sensitive control interfaces are becoming increasingly popular in modern ranges and cooktops to control a variety of cooking elements. By implementing electronic touch controls on a gas cooktop, the opening beneath the control knobs is eliminated as a source of air for the burner box.

BRIEF DESCRIPTION OF THE INVENTION

[0005] Some aspects of the present invention provide an air inlet system for a gas cooking apparatus having a cooktop, at least one gas surface burner and a burner box around the gas burner, covered by the cooktop. The cooktop has at least one peripheral vent cut configured to vent outside air into the burner box to provide air for the gas burner. The system further includes a vent trim attached to the cooktop and covering the vent cut. The vent trim has a surface with openings above a top surface of the cooktop. The openings are configured to allow outside air to enter the vent cut through the vent trim.

[0006] In yet other aspects, the present invention provides an air inlet system for a gas cooking apparatus having a cooktop, at least one gas surface burner and a burner box around the gas burner, covered by the cooktop. The cooktop also has at least one peripheral vent cut configured to vent outside air into the burner box to provide air for the gas burner. The system also includes an elongate cover member attached to the cooktop and covering the vent cut. The cover member has a surface with openings configured to allow outside air to enter the vent cut through the cover member. The cover member also includes a raised surface isolating the openings from spills on the cooktop.

[0007] In still other aspects, the present invention provides a gas cooking apparatus having a cooktop, at least one gas surface burner and a burner box around the gas burner, covered by the cooktop. The cooktop has at least one peripheral vent cut configured to vent outside air into the burner box to provide air for the gas burner. The gas cooking apparatus also includes a vent trim attached to the cooktop and covering the vent cut. The vent trim has a surface with openings above a top surface of the cooktop. The openings are configured to allow outside air to enter the vent cut through the vent trim.

[0008] In yet other aspects, the present invention provides a gas cooking apparatus that includes a cooktop, at least one gas surface burner and a burner box around the gas burner, covered by the cooktop. The cooktop also has at least one

peripheral vent cut configured to vent outside air into the burner box to provide air for the gas burner. The gas cooking apparatus also has an elongate cover member attached to the cooktop and covering the vent cut. The cover member has a surface with openings configured to allow outside air to enter the vent cut through the cover member. The cover member also has a raised surface isolating the openings from spills on the cooktop.

[0009] It will be appreciated that configurations of the present invention can be utilized to direct air to a burner box to supply sufficient air to ignite a gas supply and produce a flame while preventing food or liquid from entering the burner box. As a result, configurations of the present invention improve the performance of a gas unit as well as the ability to clean the cooktop in a cost effective and time-saving manner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1 illustrates an exemplary free standing gas range.

[0011] Figure 2 is a side view of a louver attached to the gas range shown in Figure 1.

[0012] Figure 3 is a bottom perspective view of the louver.

[0013] Figure 4 is a top perspective view of a configuration of a gas cooktop having corner cuts, wherein the gas cooktop is sitting over a burner box of a cooking apparatus, which is, for example, a gas range.

[0014] Figure 5 is a top perspective view of a configuration of a vent trim covering a vent cut of the cooktop shown in Figure 4.

[0015] Figure 6 is a bottom perspective view of the vent trim and cooktop shown in Figure 5, illustrating one of several ways in which the vent trim can be attached to the cooktop.

[0016] Figure 7 is a top perspective view of a gas cooktop configuration having side vent cuts, wherein the gas cooktop is sitting over a burner box of a cooking apparatus, which is, for example, a gas range.

[0017] Figure 8 is a top perspective view of the gas cooktop configuration of Figure 7 showing an elongate cover member covering the side vent cuts of the cooktop.

[0018] Figure 9 is a bottom perspective view of a configuration of elongate cover member suitable for use as the elongate cover member of Figure 8.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The term cooktop as used herein refers to a surface cooking system that includes at least one gas surface burner. A cooktop system can be a stand-alone unit that is mounted, for example, on a kitchen countertop. A cooktop system also can be integrated with an oven to form a range. Such cooktops and ranges are commercially available from the General Electric Company.

[0020] Gas cooktop systems typically have a generally planar glass-ceramic or porcelain cooking surface with heating units at the cooking surface. Each surface burner may be operable at various power levels. Prior to operation, a user typically positions a pot or pan containing food on the cooking surface over a burner to be operated and selects, via a user interface, a desired power setting for the burner. The cooktop system responds by supplying gas to the selected heating element in accordance with the user selected power setting.

[0021] Figure 1 illustrates a gas cooking appliance in the form of a free standing gas range 10 including an outer body or cabinet 12 that incorporates a generally rectangular cooktop 14. Figure 2 is a side view of cooktop 14. An oven 15 is positioned below cooktop 14 and has a front-opening access door 16. Cooktop 14 has a front edge 20, a rear edge 22 and side edges 24 and 26 extending between front edge 20 and rear edge 22. A range backsplash 28 extends upward of rear edge 22 of cooktop 14 and contains various control selectors (not shown) for selecting operative

features of heating elements for cooktop 14 and the oven. It is contemplated that the benefits of the present invention are applicable not only to cooktops that form the upper portion of a range, such as range 10, but to other forms of cooktops as well, such as, but not limited to, cooktops that are mounted to kitchen counters. Therefore, gas range 10 is provided by way of illustration rather than limitation, and accordingly there is no intention to limit application of the present invention to any particular appliance or cooktop, such as range 10 or cooktop 14. In addition, it is contemplated that the benefits of the present invention are applicable to dual fuel cooking appliances, e.g., a gas cooktop with an electric oven.

[0022] Cooktop 14 includes four gas fueled cooking elements or burners 30, 32, 34 and 36 which are positioned in spaced apart pairs 30, 32 and 34, 36 positioned adjacent each side of cooktop 14. Each pair of burners 30, 32, and 34, 36 is surrounded by a recessed area (not shown in Figure 1) respectively, of cooktop 14. The recessed areas serve to catch any spills from cooking utensils being used with cooktop 14. Each burner 30, 32, 34 and 36 extends upwardly through an opening in cooktop 14, and a grate assembly 40 is positioned over each respective pair of burners 30, 32 and and 34, 36. Typically, each of the burners 30, 32, 34 and 36 of cooktop 14 are connected by a gas line (not shown) to a manifold (not shown). The construction and operation of the cooktop gas burners are believed to be within the purview of those in the art without further discussion.

[0023] In one embodiment, an inlet interface panel 44 includes a display 46 and a plurality of inlet selectors 47 in the form of touch sensitive buttons or keypads for accessing and selecting oven features. In alternative embodiments, other known inlet selectors are used in lieu of touch sensitive switches.

[0024] Unlike burner control knob type ovens, inlet interface panel 44 does not have orifices to allow air to enter a burner box 48 underneath cooktop 14. Therefore, front edge 20 of cooktop 14 is shortened with respect to cabinet 12 defining a gap 49 between front edge 20 and cabinet 12. Gap 49 permits air to enter burner box 48 so as to mix with the gas to ignite and produce a flame.

[0025] In the illustrative embodiment of Figure 2, a louver 50 is fitted on front edge 20 of cooktop 14. Louver 50 guides air through gap 49 to provide air to the burner box 48 of cooktop 14. In one embodiment, at least one of side edges 24 and 26 is shortened with respect to cabinet 12 and louver 50 is mounted on at least one of side edges 24 and 26. In another embodiment, rear edge 22 is shortened with respect to cabinet 12 and louver 50 is mounted on rear edge 22. In another embodiment, louver 50 is made of stainless steel. In another embodiment, louver 50 is made of plastic. In one embodiment, louver 50 is secured to at least one of front edge 20, rear edge 22, and side edges 24 and 26 by an adhesive or a fastener.

[0026] Louver 50 has an airfoil portion 52 and an attachment portion 54. Airfoil portion 52 has a first end 56, a second end 58, a top surface 60, and a bottom surface 62. Top and bottom surfaces 60 and 62 extend between first and second end 56 and 58. In one embodiment, at least one of top and bottom surface 60 and 62 is curved.

[0027] Attachment portion 54 has a support member 70 extending from bottom surface 62 of airfoil portion 52. In one embodiment, support member 70 extends substantially perpendicular from bottom surface 62. Attachment portion 54 has a lip 72 extending substantially perpendicular to support member 70 so as to form a groove 74 between lip 72 and first end 56 of airfoil portion 52. As shown in Figure 2, bottom surface 62 guides air, indicated by arrow 76, into and through gap 49 providing air to burner box 48. In one embodiment, louver 50 is a vent allowing excess heat to exhaust from burner box 48.

[0028] Figure 3 is a bottom perspective view of louver 50. In the exemplary embodiment, louver 50 is elongate with side walls 80 and 82 at opposing ends 84 and 86. Sidewalls 80 and 82 prevent food and liquid from entering the burner box of cooktop 14. Lip 72 extends substantially along the length of louver 50. In one embodiment, louver 50 has at least one section along the length of louver 50 without airfoil portion 52 to accommodate various cooktop designs or structures, such as grate assembly 40. In another embodiment, louver 50 has at least one section along the length of louver 50 without attachment portion 54 to accommodate various cooktop

designs or structures. In a further embodiment, first end 56 of airfoil portion 52 has at least one cutout section to accommodate various cooktop designs or structures.

[0029] The above described louver directs air to the burner box thereby supplying sufficient air to ignite and produce a flame. In addition, the louver prevents food or liquid from entering the burner box. As a result, the louver improves the performance of a gas unit and improves the cleanability of the cooktop in a cost effective and time-saving manner.

[0030] In another configuration and referring to Figure 4, a burner box 48 of a cooking apparatus (for example, a gas range) is provided around one or more cooking elements or gas burners 30, 32, 34, 36. Burner box 48 is covered with a cooktop 114. Cooktop 114 can rest on and/or be sealed to a lip 102 of burner box 48. Cooktop 114 may be flat or may be formed so as to include recessed areas to catch spills. Cooktop 114 has a least one peripheral vent cut 100 that is configured to vent outside air 149 into burner box 48 to provide air for the one or more gas burners 30, 32, 34, 36. Vent cut 100 can be, but is not required to be located at a corner of cooktop 114. Electronic inlet selectors or controls 47 are provided on a top surface of the cooktop.

[0031] In the illustrative embodiment of Figure 5, vent cut 100 is covered by a vent trim 120 having a surface 122 having openings 124 raised above a top surface 126 of cooktop 114. Openings 124 allow outside air to enter through vent cut 100 so that outside air is supplied to the one or more gas cooking elements 30, 32, 34, 36. Because surface 122 is raised above cooktop surface 126, spills on the cooktop are effectively prevented from entering burner box 48. For example, surface 122 is raised above cooktop surface 126 between about 0.125 in (about 0.318 cm) to about 0.3 in (about 0.762 cm) to impede a spill of that height from entering openings 124. A maximum height for surface 122 is more likely to be determined in most configurations from aesthetic rather than air intake considerations. For example, in some configurations, surface 122 is raised by between 0.3 in (0.762 cm) to as much as much 1.0 in (2.54 cm) or more.

[0032] In some configurations vent trim 120 includes a venting portion shown generally at 128 and an attachment portion shown generally at 130. Attachment portion 130 overlaps a portion of surface 126 so that the overlapping portion of vent trim 120 can be adhesively sealed to surface 126 of cooktop 114. In particular, some configurations of the present invention provide a water-tight adhesive seal to prevent liquids spilled on cooktop 114 from entering burner box 48. Suitable adhesives include, but are not limited to, very high bonding double-sided adhesive tape.

[0033] In some configurations and referring to Figure 6, vent trim 120 is fixedly attached to cooktop 114 utilizing one or more clips such as metal clips 138. In the illustrated example configuration, a pair of clips 138 fixedly attach between a mounting portion 136 inside a recessed region 134 of vent trim 120 and clip retainers 140 fixedly attached to an underside 132 of cooktop 114. Some configurations utilize one or more clips 138 as well as adhesive at attachment portion 130 to ensure a water-tight seal. Also in some configurations and referring to Figure 4, vent cut 100 is at a rear corner of cooktop 114, or at more than one rear corner of cooktop 114. However, the one or more vent cuts 110 are not required to be located at rear corners of cooktop 114, and one or more may be located at front corners..

[0034] In some configurations of the present invention, cooktop 114 comprises formed glass, and vent trim 120 is a color matched die cast metal part. In some configurations having a flat glass cooktop 114 with a cast grate, a stainless steel vent trim 120 can be used.

[0035] In some configurations of the present invention vent cuts can be located along an edge of a cooktop, with the vent trim appropriately shaped to cover the edge vent cuts. For example, in the illustrative embodiment of Figure 7, a cooktop 214 (either flat glass or formed glass) is provided with one or more peripheral vent cuts 200 along an edge 250. Vent cuts 200 can be along an edge of cooktop 214 exclusive of a corner of cooktop 214. Air is guided into burner box 48 by providing a burner box 48 around one or more gas burners 30, 32, 34, 36. Sealed cooktop 214 is provided, wherein cooktop 214 is configured to cover burner box 48. Cooktop 214

also has at least one peripheral vent cut 200 that is configured to vent outside air through gap 249 into burner box 48 to provide air for the one or more gas burners 30, 32, 34, 36. In addition, and referring to Figure 8, an elongate cover member 260 is provided. Elongate cover member 260 is attached to cooktop 214 at a top surface 226. Cover member 260 has a surface 222 with openings 224 that are configured to allow outside air to enter vent cut or cuts 200 through cover member 260. Cover member 260 also has a raised portion 262 isolating openings 224 from spills on cooktop 214. Cover member 260 can extend along an entire side 250 of top face 226 of cooktop 214. Cover member 260 can be made of cast metal such as stainless steel, although other materials and methods of making cover member 260 (e.g., sheet metal) are also contemplated. In some configurations and referring to Figure 9, elongate cover member 260 includes tabs or surfaces 264 on its underside wherein an attachment can be made to surface 226 of cooktop 214 utilizing an adhesive. A water-tight adhesive attachment can be provided utilizing, for example, high bond strength double-sided adhesive tape.

[0036] The above described air inlet systems can be utilized in a gas cooking apparatus such as gas range 10 to direct air to a burner box to supply sufficient air to ignite a gas supply and produce a flame. In addition, each of the above-described air inlet systems prevents food or liquid from entering the burner box. As a result, the air inlet system improves the performance of a gas unit and improves the cleanability of the cooktop in a cost effective and time-saving manner.

[0037] While the invention has been described in terms of various specific embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the claims.